

ISOLATION AND DIAGNOSIS PATHOGENS OF GASTROINTESTINAL TRACT WITH  
MECHANICAL VECTOR

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Article Received on 09/10/2024

Article Revised on 29/10/2024

Article Accepted on 19/11/2024

## ABSTRACT

Isolation and diagnosis of pathogen, of intestinal disease in different area in Basra from four the most brilliant hospital, namely; AL-Zubair, AL-sader teaching, Abu AL-Kasib and Qurna hospital, including parasite and bacterial infection. Highest rate of bacterial infection of *Helicobacter pylori* bacteria 82.9% in Abu AL-Kasib hospital and *Escherichia coli* 9% in AL-Zubair hospital, parasitic infection were *Entamoeba histolytica* parasite 81% in Abu AL-Kasib hospital and *Trichomonas hominis* and *Gerardia lambilia* parasite 1% in Abu AL-Kasib hospital. Also, the search show eleven bacteria species were isolated from *Musca domestica*, house fly mechanical vector of Animal Agent disease, seven of them Gram-negative bacteria and four species of Gram-positive bacteria were isolated.

## INTRODUCTION

Gastrointestinal infections – group of diseases are caused by bacteria, viruses or parasites, which have similar symptom complex, they are the most common infectious diseases worldwide causing about 2 billion gastroenteritis cases every year.

Gastrointestinal infections are the second most common cause of death in children under the age of 5 years. There are three main ways of transmission of gastrointestinal infections are contaminated food, water and from person to person by direct contact. The main source of infection is an infected person or a carrier of a pathogenic infection, symptoms usually begin 12-72 hours after infection, if due to a virus, the condition usually resolves within one week.

Some bacterial infections may persist for several weeks. Bacteria: *Campylobacter spp.*, *Salmonella spp.*, *Shigella spp.* and pathogenic strains of *Escherichia coli*; *Listeria spp.*, *Bacillus cereus*, *Clostridium perfringens*, *Staphylococcus aureus*; Parasites: *Giardia lamblia*, *Entamoeba histolytica*, *Cryptosporidium spp.*, symptoms include:- Cramps, abdominal pain, diarrhea, sometimes blood in the stool, nausea, vomiting, fever and headache (Gruber et al. 2014).

Parasitic infections, caused by intestinal *helminths* and protozoan parasites, are among the most prevalent infections in humans in developing countries. In developed countries, protozoan parasites more commonly cause gastrointestinal infections compared to *helminths*. There are four species of intestinal helminthic

parasites, also known as *geohelminths* and soil-transmitted *helminths*: *Ascaris lumbricoides* (roundworm), *Trichiuris trichiuria* (whipworm), *Ancylostoma duodenale*, and *Necator americanus* (hookworms). These infections are most prevalent in tropical and subtropical regions of the developing world where adequate water and sanitation facilities are lacking (Savioli, 2004) Recent estimates suggest that *A. lumbricoides* can infect over a billion, *T. trichiura* 795 million people, and hookworms 740 million people. Other species of intestinal *helminths* are not widely prevalent. Intestinal *helminths* rarely cause death. Instead, the burden of disease is related to less mortality than to the chronic and insidious effects on health and nutritional status of the host, (Stephenson et al, 2000).

The World Health Organization (WHO) estimates that approximately 50 million people worldwide suffer from invasive amoebic infection each year, resulting in 40-100 thousand deaths annually, (Petri et al, 2000).

*Cryptosporidiosis* is becoming most prevalent in both developed and developing countries among patients with AIDS and among children aged less than five years. Several outbreaks of diarrheal disease caused by *C. cayetanensis* have been reported during the last decade, (Herwaldt et.al, 2000). Spread of these protozoan parasites in developing countries mostly occurs through faecal contamination as a result of poor sewage and poor quality of water.

The housefly *Musca domestica*, is one of the most common and widely distributed insects found all over the

world. Since houseflies as the name suggests, cohabit with humans, poultry, and animals, these can readily contaminate food and utensils. These are considered important mechanical vector for number of pathogenic bacteria, protozoa, metazoan, fungi and viruses, (Kassiri et.al, 2012). Microorganisms are picked up by the flies from garbage, sewage and other sources of filth on their mouth parts and other body parts, and then transferred to human and animal food.

The major diseases that are associated with the housefly as a vector include *Shigellosis*, *Salmonellosis*, *Cholera*, Hepatitis A and E, Polio, Amoebic dysentery, parasitic worms and eye infections (trachoma and epidemic conjunctivitis), (Ugbogu et.al, 2006).

The microorganisms that stick to the outside surfaces of the fly may survive only for a few hours, but those that are ingested with the food may survive in the fly gut for variable period [Pava-Ripoll et al 2015]. transmission dynamics from adult house flies to their eggs and first filial (F1) generation adults. BMC Microbiol 15: 150]. Transmission takes place when the fly makes contact with people or their food. Most of the diseases can also be contracted through contaminated food, water, air, hands and person-to-person contact. Fecal contamination of food and water is detected by surrogate markers, *E. coli* and other coliforms [Gruber et al, 2014].

## MATERIAL AND METHODS

A survey of intestinal parasitic and bacterial infections a survey of scientific date and prevalence of enteric bacteria and enteric parasite include kind of Pathogen, age and gender of infected human.

In Basra city include a period from July 2023 to November 2023 A sample were collected from hospitals affiliated with the Basrah health department The education AL sadder which is located in Basra center, Qurna hospital which is located in the city of Qurna in Barsa, AL-Zubair hospital which located in AL- Zubair District in Basra, and Abo AL-Khasib Hospital which located in Abo AL- Khasib District in Basra governorate.

Brought and conveyed scientific information to pathologies analysis department, science collage, Basra Unveracity, Datal Analyzed statically.

## Collected of mechanical vector

**Types:** *Musca domestica*

**Family:** Muscidae

House flies were collected from market place randomly in Basra city through period of November 2023.

All flies were preserved by freezing at (-15C) for 30 minute and then immersed In normal saline and shaken

for 5\_10 minute.

The washed flies' bodies were filtered out and the fluid was test for bacteria (Ishartadialti el al, 2007).

The taxonomy of Diptera house flies were carried to (AL-Hlfi, 2001) House fly sample were cultured on primary media:

Blood agar base (Oxoid)

MacConkey Agar

And Nutrient Agar (HI media) (Forbes, et al, 1998) And then incubated Aerobically at 37c for 24-48 hours, samples cultured on Chocolate Agar in Addition to nutrient agar were incubated an aerobically in candle jar at thesame temperature and period above.

## Bacterial count

Enumeration of a total bacteria count per ml of same sites were carried by Using a serial dilution of nutrient broth (Hi media and then culturing on Nutrient agar (Forbes, et al, 1998).

## Identification techniques: four types of Api

Techniques (Bio meriux, France) were used for rapid identification of varies bacteria isolated based on enclosed instruction of supplied company.

## Diagnosis of parasites (In general other methods)

**I. Microscopic examination:** A sample of body fluid, stool, urine, or blood is prepared and exanimated under a microscopic to find parasites

**II. Culture:** A sample of body fluid, stool, or urine is placed on a special culture medium and the continuous growth of the parasite in the medium.

## RESULTS

The results showed that (175) were recorded from the pathogens of infectious diseases in Basra, where (83) were recorded from pathogenic parasites and (88) from bacterial spores, as in Table (1). We conclude from the results that the parasitic species *Entamoeba histolytica* is the most common, representing a percentage (81%), while the species *Trichomonas hominis* is the least forgotten spread (1%). The bacterial infections varied among the various bacterial spores, with *Helicobacter pylori* being the most common (82%), while *Escherichia coli* was the least (9%). The results were also recorded for normal flora, *candida* and *Monilia*.

❖ Table 1: Parasitic infection of gastrointestinal tract in Basra hospitals, 2023.

Male, age	Species of pathogen	Number & % of each pathogens	Total numbers
0-20	<i>Entamoebahistolytica</i>	7(8.4%)	8
	<i>Giardia lamblia</i>	1(1.2%)	
20-40	<i>Entamoebahistolytica</i>	27(32.5%)	31
	<i>Monilia</i>	4(4.8%)	
40-60	<i>Entamoebahistolytica</i>	3(3.6%)	4
	<i>Trichomonashominis</i>	1(1%)	
>60	<i>Entamoebahistolytica</i>	1(1%)	1
Female, age	Species of pathogen	Number & % of each pathogens	Total numbers
0-20	<i>Entamoebahistolytica</i>	5(6%)	5
20-40	<i>Entamoebahistolytica</i>	14(16.8%)	23
	<i>Monilia</i>	9(10.8%)	
>40	<i>Entamoebahistolytica</i>	5(6%)	8
	<i>Monilia</i>	3(3.6%)	

➤ Table (2) showed the differences in incidence between genders (male or female) in the bacterial causes of intestinal diseases. The incidence of males was (39.7%) while the incidence of females was (54.5%). The results also showed a difference in

infection for human ages, males and females. Ages (0-20) years had an infection rate (35.2%), ages (20-40) had an infection rate (51.1%), and ages (40-60) had an infection rate (7.9%).

❖ Table 2: Bacteria infection of gastrointestinal tract in Basra hospitals, July-October 2022-2023.

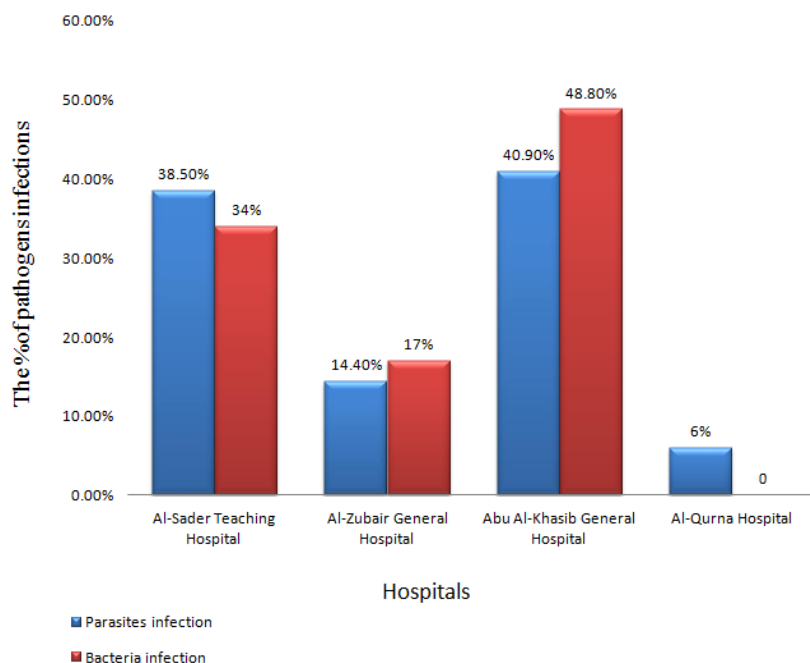
Male, age	Species of pathogen	Number & % of each pathogens	Total numbers
0-20	<i>Helicobacter pylori</i>	10(11.3%)	13
	<i>Escherichia coli</i>	1(1.1%)	
	<i>Normal flora</i>	2(2.2%)	
20-40	<i>Helicobacter pylori</i>	17(19.3%)	17
40-60	<i>Helicobacter pylori</i>	4(4.5%)	5
	<i>Normal flora</i>	1(1.1%)	
Female, age	Species of pathogen	Number & % of each pathogens	Total numbers
2-20	<i>Helicobacter</i>	14(15.9%)	18
	<i>pylori</i>		
	<i>Escherichia coli</i>	3(3.4%)	
	<i>Normal flora</i>	1(1.1%)	
20-40	<i>Helicobacter pylori</i>	28(31.8%)	28
>40	<i>Helicobacter pylori</i>	2(2.2%)	2

➤ The results in Table (3) showed the number of parasitic and bacterial infections in Basra hospitals (Al-Sadr Teaching Hospital, Abu Al-Khasib General Hospital, Al-Zubair General Hospital, and Al-Qurna Hospital). The number of bacterial infections was greater than the number of parasitic infections. We

noticed that both parasitic and bacterial infections were the highest in number in both Al-Sadr Teaching Hospital and Abu Al-Khasib General Hospital during the months of July and October in the year 2022- 2023.

❖ Table 3: Total parasites and bacteria infections of gastrointestinal diseases in Basra hospitals, July-October 2022-2023.

Pathogens	Al-Sadr Teaching Hospital	Al- Zubair General Hospital	Abu Al-Khasib General Hospital	Al- Qurna Hospital	Total
Parasites infection	32	12	34	5	83
Bacteria infection	30	15	43	No found	88



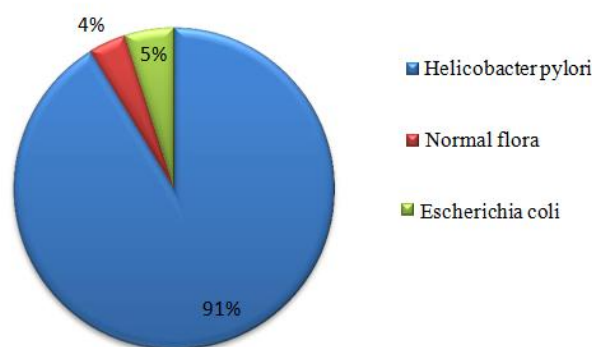
**Figure 1: % of pathogens infections in Basra hospitals, from July to October (2022-2023).**

➤ In **Table (4)**, the presence of types of pathogens in all hospitals is determined. *Helicobacter pylori* appeared in Al-Sadr Teaching Hospital and Abu Al-Khasib General Hospital, *Normal flora* appeared in Al-Zubair General Hospital only, *Escherichia coli* appeared in Al-Zubair General Hospital only. As for

*Entamoeba histolytica*, it was observed in Al-Sadr Teaching Hospital, Al-Zubair General Hospital, Abu Al-Khasib General Hospital, and Qurna, and *Monilia* appeared in Al-Sadr Teaching Hospital only, and also *Giardia lambila* and *Trichomonas hominis* appeared in Abu Al-Khasib Hospital only.

**Table 4: The presence of types of pathogens in Basra hospitals, July-October 2022-2023.**

Pathogens	Al-Sadr Teaching Hospital	Al-Zubair General Hospital	Abu Al-Khasib General Hospital	Al-Qurna Hospital
<i>Helicobacter pylori</i>	+	-	+	-
<i>Normal flora</i>	-	+	-	-
<i>Escherichia coli</i>	-	+	-	-
<i>Entamoeba histolytica</i>	+	+	+	+
<i>Monilia</i>	+	-	-	-
<i>Trichomonas hominis</i>	-	-	+	-
<i>Giardia lambila</i>	-	-	+	-



**Figure 2: % of species of bacteria infections in Basra hospitals, from July to October in 2022-2023.**

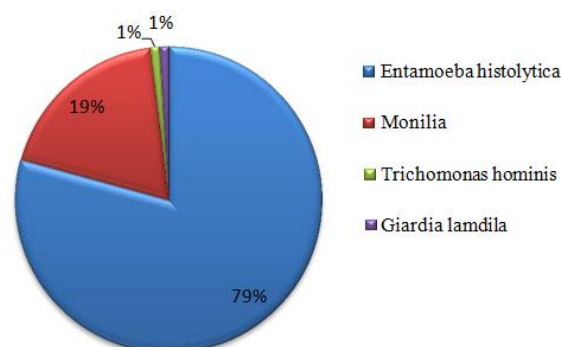


Figure 3: % of species of parasite infections in Basra hospitals, from July to October in 2022-2023.

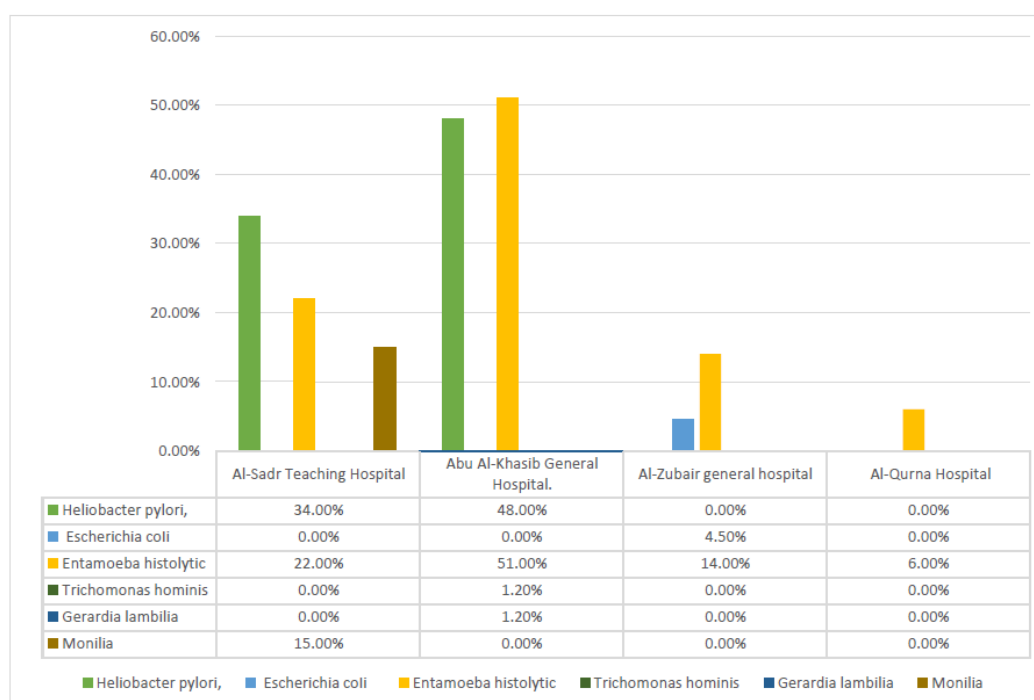


Figure 4: % of pathogens causing intestinal diseases in Basra hospitals.

## RESULTS OF MECHANICAL VECTOR

Results show in table (5) illustrated all bacteria types isolated from these Animal Agents House flies and these bacteria differentiation in their types and numbers among these trueflies insect, in general eleven genera include eleven species of these germs isolated from *Musca domestica* animal agents, so that in a total of all there bacteria species isolated and identified from position sample, taken from markers. *E.coli* predominate in *Musca domestica* insect, and then *Klebsiella sp.* gram negative and *Staphylococcus* and then *Streptococcus*, *Enterococcus* and *Actinomyces* as Gram positive bacteria, other bacteria species ranging between them of

all Gram negative and Gram positive bacteria.

The number of the species of the category of bacteria were, gram negative bacteria include *Musca domestica* insect four Gram negative and seven positive bacteria and total number of bacteria  $8 \times 10^8$  and  $4 \times 10^6$  in Dilution ( $10^{-1}$ ) and  $13 \times 10^{-15}$  in dilution ( $10^{-2}$ ) and in a total species of bacteria were isolated and identified from positive samples taken from these flies, mechanical animal agents, the number of species from this category of bacteria Gram positive 7 species isolated and Gram negative bacteria 4 species isolated from trueflies mechanical animal agents.

❖ Table 5: Species of bacteria which isolated from mechanical vector, July-October 2022-2023.

Truefly	Gram negative bacteria	Gram positive bacteria
<i>Musca domestica</i>	<i>Escherichia coli</i> <i>Klebsiella sp</i> <i>Proteus mirabilis</i>	<i>Bacillus subtilis</i> <i>Streptococcus mitis</i> <i>Enterococcus faecalis</i> <i>Staphylococcus saprophyticus</i> <i>Staphylococcus xylosus</i> <i>Actinomyces sp.</i>

## DISCUSSION

The results of the previous study in Diwaniyah Governorate showed that children were infected with seven types of intestinal parasites, the most common of which was the *Entamoeba histolytica* parasite (66.8%), followed by the *Giardia* parasite (66.8%). (36.8%), then the rest of the parasites in different percentages. The reason for the high incidence of infection with some parasites alone is their direct transmission to humans through ingestion of food and water contaminated with infectious stages and the contribution of flies, which are considered a vital vector of the parasite, [Zigbig, E.A. (1997). Clinical parasitology: A practical approach. W. B. Saunders Co. Philadelphia: 325pp]. The rate of infection with intestinal parasites was (21.1%), which is identical to what was found by [Hussein Abdel-Wahab Badaiwi (2009) Study of the prevalence of intestinal parasites in patients attending some Baghdad hospitals, Anbar University Journal of Pure Sciences, 3 (2): 1-11], and it is identical to what he found in a study conducted in some hospitals in Baghdad Governorate, where it was (21.6%), but it is much lower than what was recorded (5). In his study on Children in Mahmoudiya Hospital in Baghdad, which amounted to (57.8%). Therefore, the infection rate in this study is Low, and the reason for the difference may be attributed to many reasons, the most important of which are related to the service and environmental situation and general cleanliness. The difference in living and social standards and also the difference in the examination methods used. The study showed that males are more infected with intestinal parasites than females, as the percentage in males was (21.4%) and in females (20.8%), [Al-Hilli, Lama Ali (2005). Prevalence of intestinal parasites in children aged 6-8 years in Al-Hindiyya (Tuwayraj) District, Al-Technical Journal, Technical Education Authority, 21 (3): 1-7]. When comparing the results of this research with previous studies in Diwaniyah Governorate, we note that parasitic infections are mostly *Entamoeba histolytica*, as well as *Giardia*, but they are less common than *Entamoeba histolytica*.

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